

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ C$
-100V	250m Ω @ $V_{GS} = -10V$	-2.3A
	300m Ω @ $V_{GS} = -4.5V$	-2.1A

Description

This MOSFET is designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.


Applications

- Motor Control
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

Features and Benefits

- Low Gate Drive
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

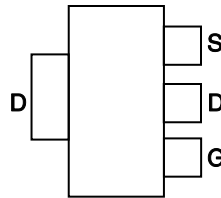
- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 
- Weight: 0.112 grams (Approximate)

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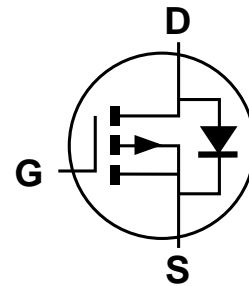
SOT223



Top View



Pin Out - Top View



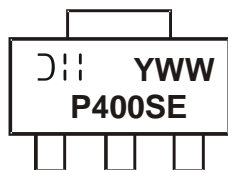
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
DMP10H400SE-13	Standard	SOT223	2,500 / Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



- ⌋⌋ = Manufacturer's Marking
- P400SE = Marking Code
- YWW = Date Code Marking
- Y or \bar{Y} = Year (ex: 4 = 2014)
- WW = Week (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-100	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 5) V _{GS} = -10V	Steady State	T _C = +25°C T _A = +25°C	I _D	-6.0 -2.3	A
Maximum Body Diode Forward Current (Note 5)			I _S	-1.9	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I _{DM}	-10	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C		P _D	2.0	W
	T _A = +70°C			1.3	
Thermal Resistance, Junction to Ambient (Note 5)			R _{θJA}	62	°C/W
Total Power Dissipation (Note 5)			P _D	13.7	W
Thermal Resistance, Junction to Case (Note 5)			R _{θJC}	9.1	°C/W
Operating and Storage Temperature Range			T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	-100	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = -80V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	V _{GS(TH)}	-1.0	-2.2	-3.0	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	203	250	mΩ	V _{GS} = -10V, I _D = -5A
		—	241	300		V _{GS} = -4.5V, I _D = -5A
Diode Forward Voltage	V _{SD}	—	-0.9	-1.2	V	V _{GS} = 0V, I _S = -5A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{ISS}	—	1239	—	pF	V _{DS} = -25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{OSS}	—	42	—		
Reverse Transfer Capacitance	C _{ISS}	—	28	—		
Gate Resistance	R _G	—	13	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	8.4	—	nC	V _{DS} = -60V, I _D = -5A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	17.5	—		
Gate-Source Charge	Q _{gs}	—	2.8	—		
Gate-Drain Charge	Q _{gd}	—	3.2	—		
Turn-On Delay Time	t _{D(ON)}	—	9.1	—	ns	V _{DD} = -50V, R _G = 9.1Ω, I _D = -5A
Turn-On Rise Time	t _R	—	14.9	—		
Turn-Off Delay Time	t _{D(OFF)}	—	57.4	—		
Turn-Off Fall Time	t _F	—	34.4	—		
Body Diode Reverse Recovery Time	t _{RR}	—	25.2	—	ns	V _{GS} = 0V, I _S = -5A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{RR}	—	24.5	—	nC	V _{GS} = 0V, I _S = -5A, dI/dt = 100A/µs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

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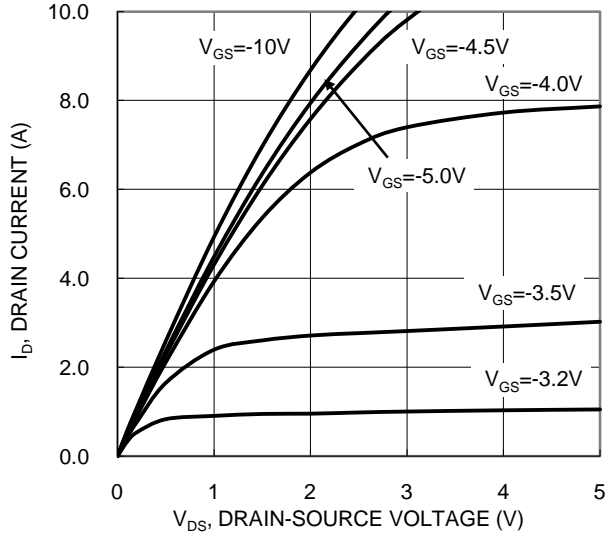


Figure 1. Typical Output Characteristic

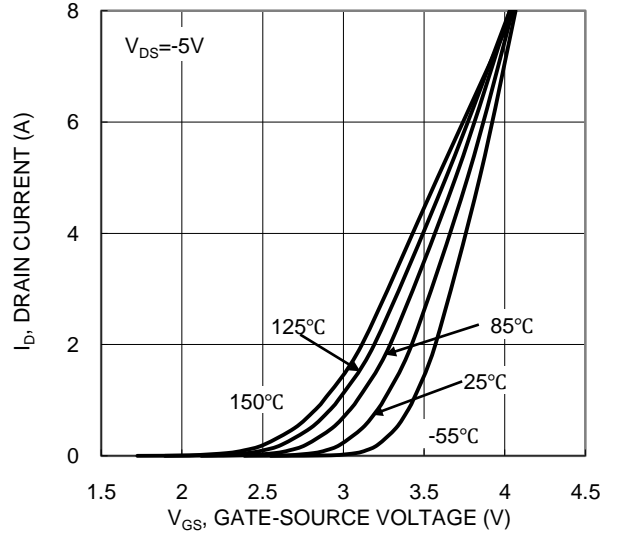


Figure 2. Typical Transfer Characteristic

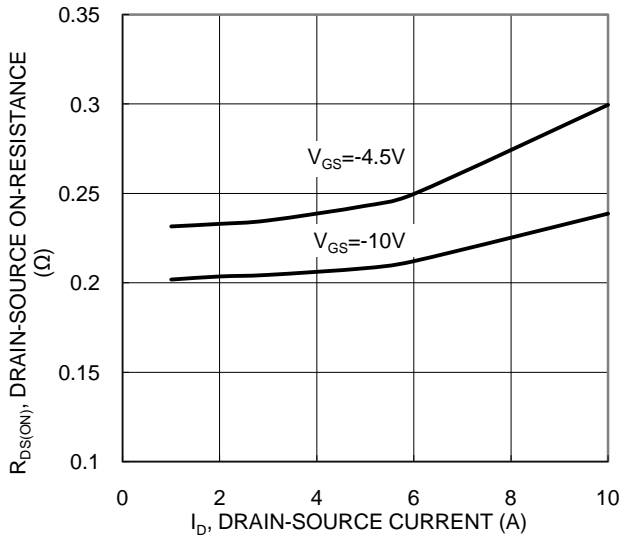


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

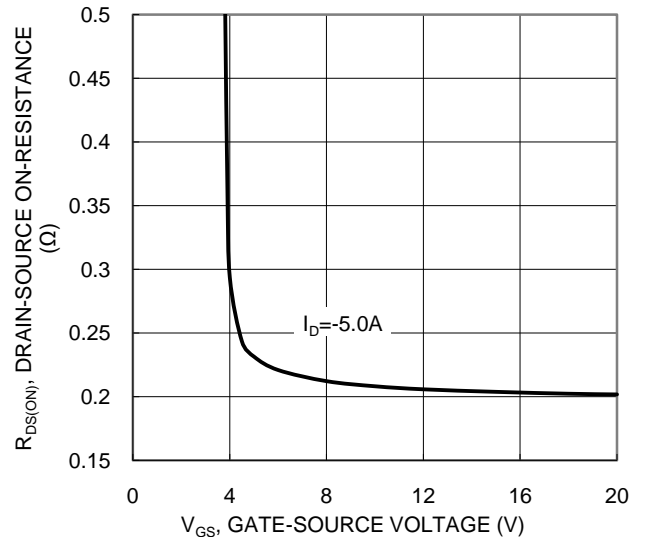


Figure 4. Typical Transfer Characteristic

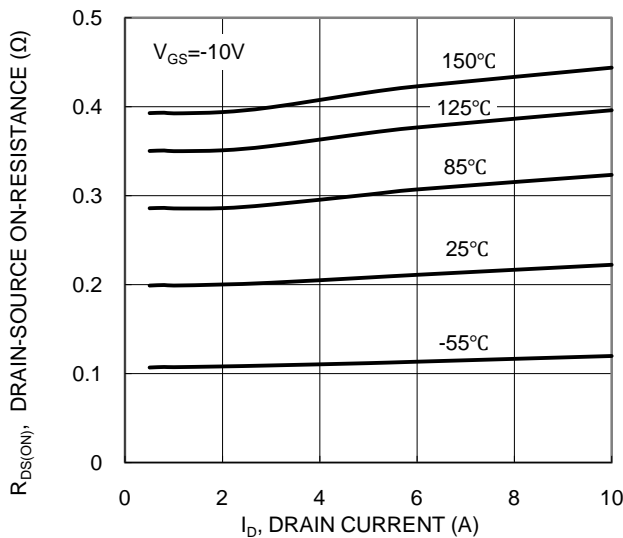


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

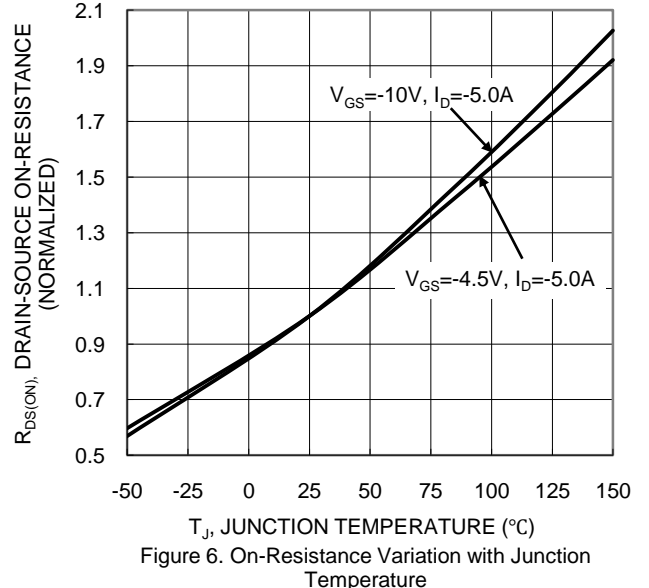


Figure 6. On-Resistance Variation with Junction Temperature

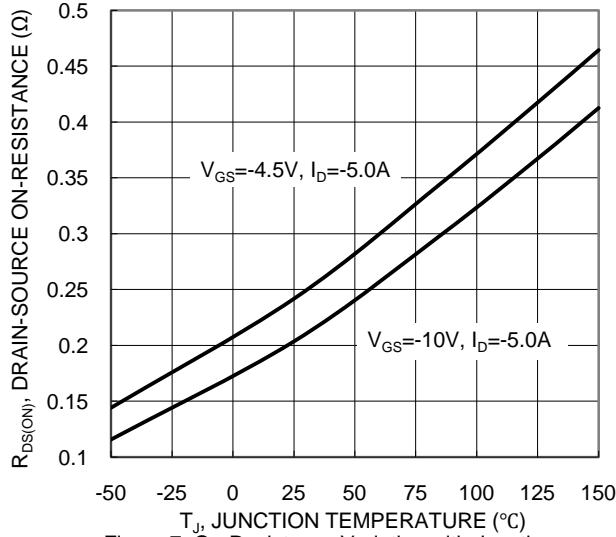


Figure 7. On-Resistance Variation with Junction Temperature

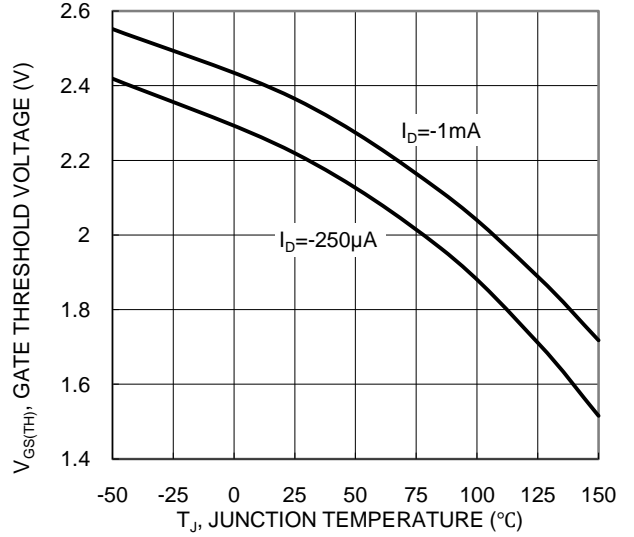


Figure 8. Gate Threshold Variation vs. Junction Temperature

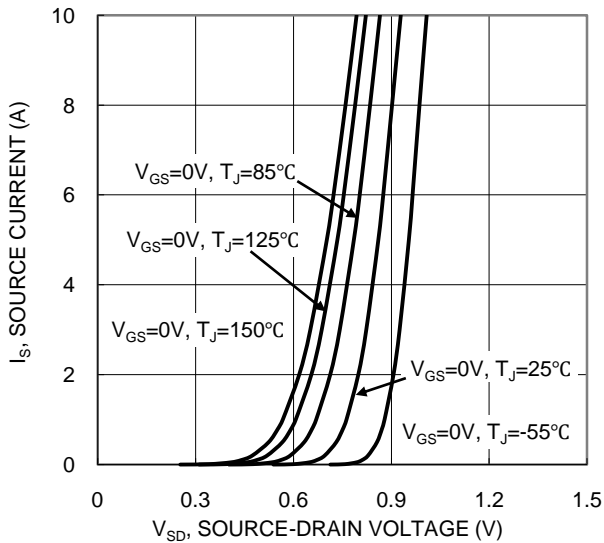


Figure 9. Diode Forward Voltage vs. Current

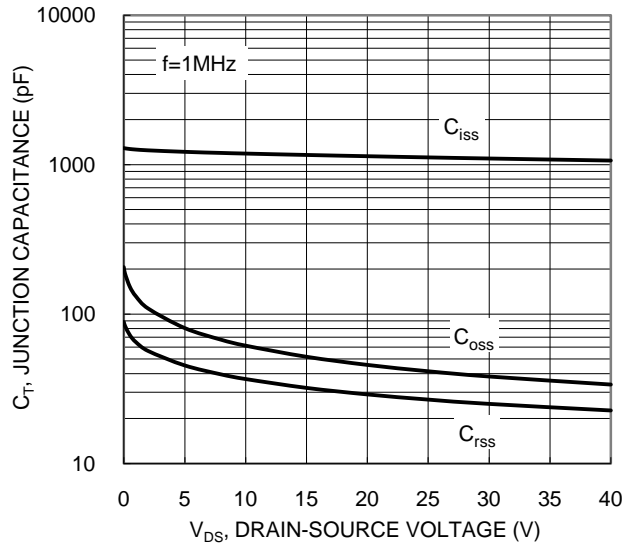


Figure 10. Typical Junction Capacitance

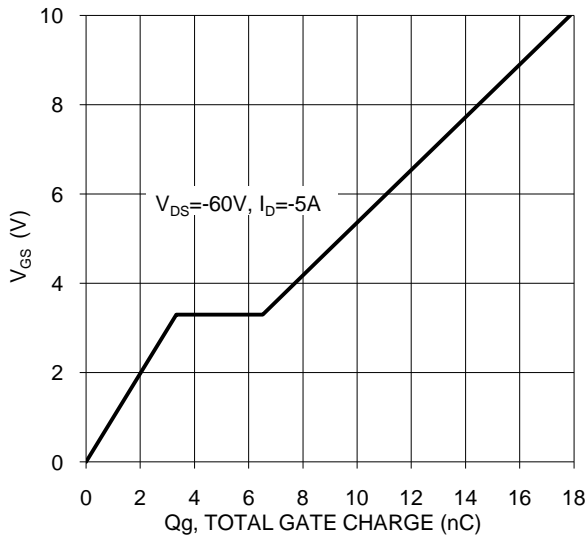


Figure 11. Gate Charge

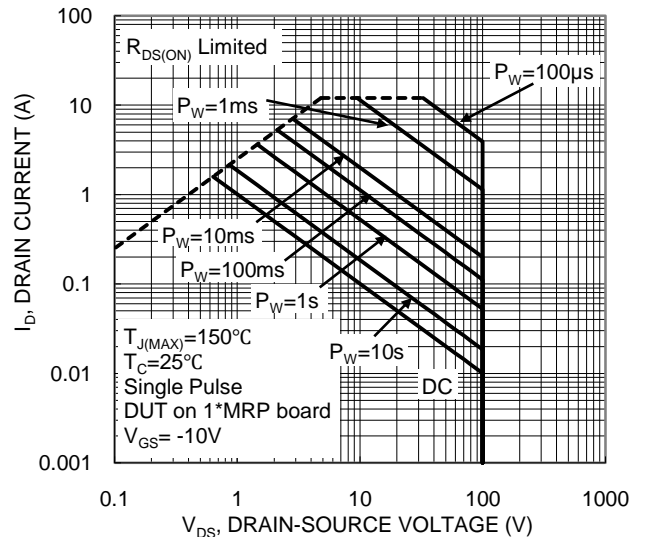


Figure 12. SOA, Safe Operation Area

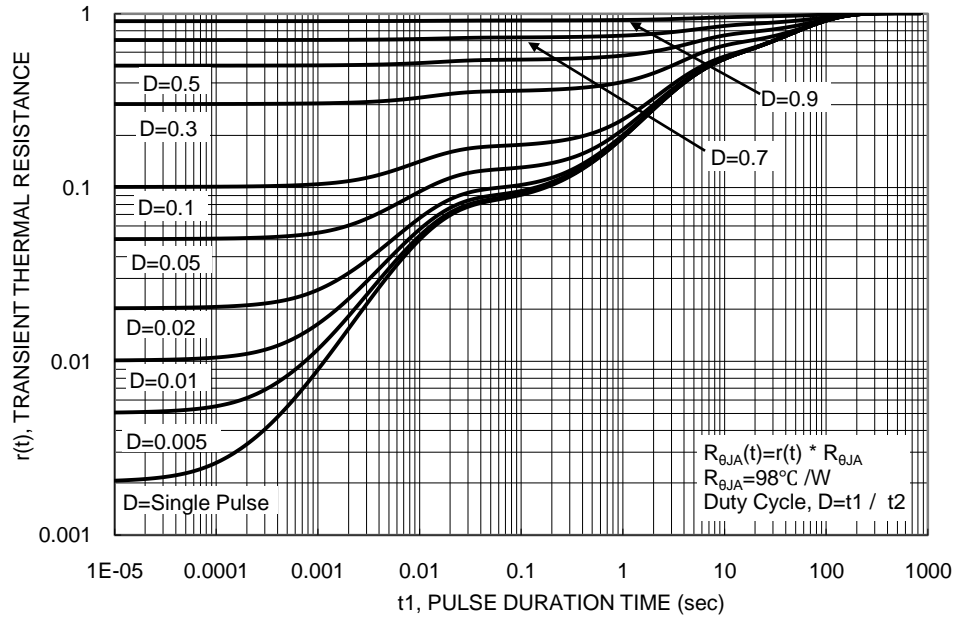
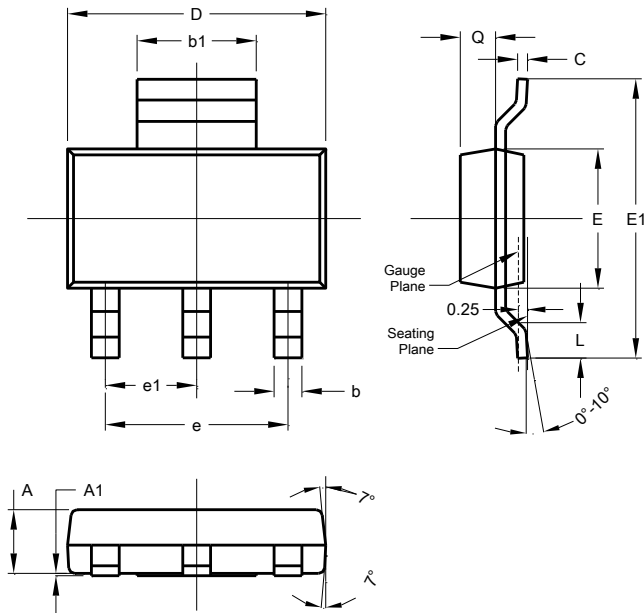


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

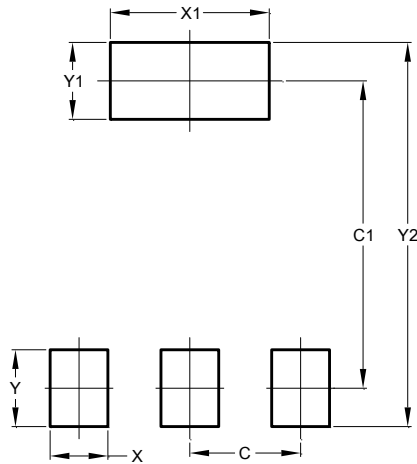
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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